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AUTHOR	Goldberg, Robert
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ABSTRACT

The Pennsylvania State Department of Education developed an automated system in 1970 to facilitate meeting report requirements to the United States Office of Education. This system provides for computer processing of such information as labor market needs in planning vocational programs, standards for these programs, graduate followup, demographic profiles of pupils and teachers, and utilization of facilities. The starting point of the system, the manpower conversion equation, indicates underdeveloped manpower resources as input into employment policies, manpower requirements, labor supply, and manpower development sources. The system operation calls for meeting the information needs of various management functions concerning the vocational education process and its products. The system programs and procedures discussed in this document were established as a backup facility for the Pennsylvania State Department of Education's present outside contractor. (Author/MF)

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FINAL REPORT

VEMIS Backup Facility and Transfer of Functions: Phase I, Pilot Implementation (Project No. 19-4008)

Robert Goldberg

Bureau of Information Systems

Harrisburg, Pennsylvania

January 1975

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Abstract

The purpose of the project was to establish an organization within the intermediate unit to provide for a backup to the present VEMIS contracted facility and to independently operate, some time in the future, parts of the VEMIS system. As Educational Systems Research Institute (ESRI), who is the present contractor, develops and operates a component of the system and establishes its reliability, it is planned to transfer the component system from the contractor to the Pennsylvania Department of Education with the assistance of the Intermediate Unit.

Initial efforts in the project were concerned with those programs that produce final reports given a set of error-free master files.

The project developed into four major activities:

1. Providing for a computer facility to implement the project and establishment of methods for accessing the selected computer facility.
2. Working with the contractor to develop procedures for acquiring programs and associated documentation.
3. Converting and documenting the programs received from the contractor for use by the Intermediate Unit.
4. Selection of a consultant.

The project staff developed a working relationship with the computer center staff to effectively utilize the available resources. A terminal was used as the means for inputing jobs, correcting and/or changing coding, and executing the converted programs.

The format and content of the documentation received from the contractor was reviewed for its contents and quality and suggestions were made for improvements. The staff met with contractor personnel to develop and revise schedules for the receipt of programs and documentation.

We were only able to hire a programmer at the end of April and started the conversion of programs and the development of the necessary job control language in the second week of May. Additionally, staff time was spent becoming familiar with the scope and content of the computing phase of the VEMIS system.

Prepared material that could be used by prospective consultants to determine the scope of the system and would allow them to understand their role they would play within the scope of the project.

INTRODUCTION

Purpose

The purpose of the project was to establish an organization within the Intermediate Unit to provide for a backup to the present VEMIS contracted facility and to independently operate, some time in the future, parts of the VEMIS system. As Educational Systems Research Institute (ESRI), who is the present contractor, develops and operates a component of the system and establishes its reliability, it is planned to transfer the component system from the contractor to the Pennsylvania Department of Education with the assistance of the Intermediate Unit.

Initial efforts in the project were concerned with those programs that produce final reports given a set of error-free master files.

Background Information

Prior to 1970, Pennsylvania struggled with the United States Office of Education Annual Report Requirements by use of a manual data reporting system. The rigid manual system had to provide information that would reflect an environment where enrollments had increased over 400 per cent and the number of different curriculum offerings tripled as expenditures climbed toward the $200 million mark. Once the size of the operation was appreciated by administrators, they began to

ask management-oriented questions. For example, To what extent should emphasis be placed on labor market needs in planning new vocational programs?; What standards should be imposed on existing and new programs?; What happens to graduates after they complete their training?; What is the capacity utilization of our present facilities?; What is the profile of our pupils and teachers in terms of race, sex, geographic mobility, competence, age groupings, earnings, turnover, etc.? It was decided in 1970 that these questions could more effectively be answered if an automated system was developed.

User requirements relating to specific system applications and policy is provided by five advisory committees representing the various educational levels and institutions incorporated in the system. The 27 members of the secondary advisory committee include state vocational education staff in the Bureau of Vocational Education, regional office chiefs, representatives from cooperating state agencies such as the Research Coordinating Unit, the Bureau of Information Systems, the Office of Planning in Higher Education as well as several local administrators.

The theoretical starting point of the VEMIS System is the manpower conversion equation as shown in Figure 1. The model shows underdeveloped manpower resources as input into four broad channels of manpower conversion or development to: (1) the national policy of full employment, (2) the existing and projected manpower requirements of changing economy, (3) the existing and projected supply of underdeveloped manpower resources and (4) the public and private sources of skilled manpower development.

Objectives

The functions and activities of the Bureau of Vocational Education were assessed to determine the objectives to be achieved by this project. The design

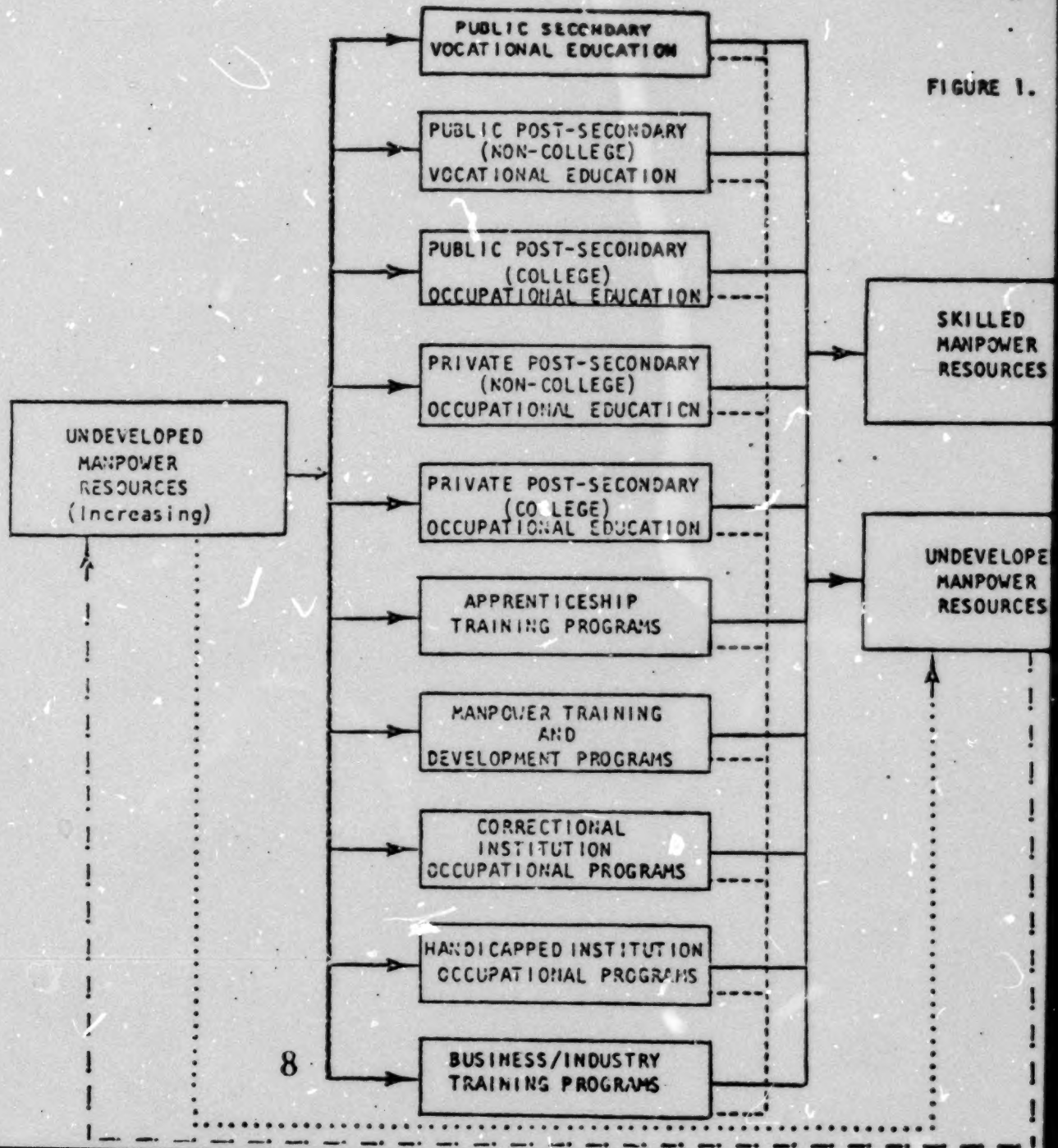
PUBLIC SECONDARY VOCATIONAL EDUCATION
PUBLIC POST-SECONDARY (NON-COLLEGE) VOCATIONAL EDUCATION
PUBLIC POST-SECONDARY (COLLEGE) OCCUPATIONAL EDUCATION
PRIVATE POST-SECONDARY (NON-COLLEGE) OCCUPATIONAL EDUCATION
PRIVATE POST-SECONDARY (COLLEGE) OCCUPATIONAL EDUCATION
APPRENTICESHIP TRAINING PROGRAMS
MANPOWER TRAINING AND DEVELOPMENT PROGRAMS
CORRECTIONAL INSTITUTION OCCUPATIONAL PROGRAMS
HANDICAPPED INSTITUTION OCCUPATIONAL PROGRAMS
BUSINESS/INDUSTRY TRAINING PROGRAMS
UNDEVELOPED MANPOWER RESOURCES (Increasing)
SKILLED MANPOWER RESOURCES
UNDEVELOPED MANPOWER RESOURCES

FIGURE 1.

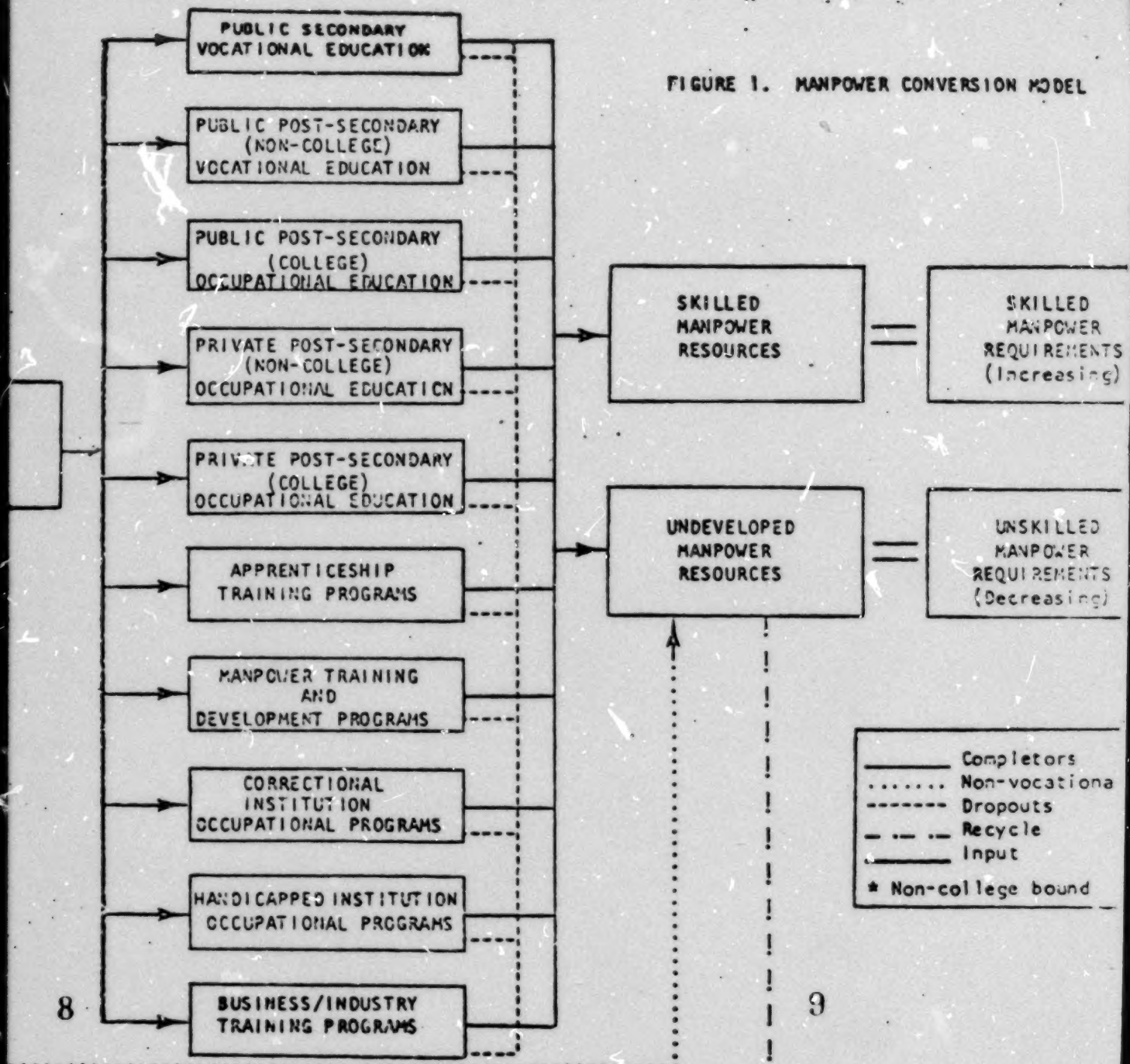

FIGURE 1. MANPOWER CONVERSION MODEL

and operation of VEMIS provides for meeting the information needs of the following management functions:

- Establishing/influencing program goals and objectives
- Establishing/communicating policies and guidelines
- Establishing/applying program approval standards
- Collecting/reporting program descriptive information
- Identifying/solving problems concerning objectives
- Forecasting/projecting program characteristics
- Planning changes related to program objectives
- Reporting information to other agencies
- Coordination of planning with other agencies
- Researching for solutions to basic program problems
- Evaluation of vocational programs regarding objectives
- Controlling the quality of vocational education
- Processing applications for special funding
- Establishing internal standard procedures
- Reimbursing local educational agencies
- Organizing for the accomplishment of objectives
- Providing advisory/consultative support to the field
- Budgeting available vocational education funds
- Stimulating change through information dissemination
- Planning/controlling construction of new facilities
- Assessing short- and long-term manpower requirements
- Assessing short- and long-term manpower resources

The list is not exhaustive. All of the functions listed, however, have one thing in common, <u>the need for information about the vocational education process and its products</u>.

No formal computer-based management information system should [illegible] provide all the information needed to service the basic management functions. Indeed, there can be no such system. It is the process of management reaction to information that most often determines the need for further information to complete the management functions.

Methods

The first subsystem that we decided to convert was the survey subsystem. We selected this system because of the availability of reasonable documentation. The subsystem provides follow-up information about graduates and dropouts. Information is collected about employment, education, course relativity and value, and job seeking methods.

For the survey subsystem, the Intermediate Unit staff met with the contractor to complete the "Processing Summary Information Form." The completion of the forms allowed the staff to gain an understanding of the number of programs that needed to be converted, input master files, computer core requirements and storage media to allow for the establishment of device requirements (Figure 2). When a master file was received from the contractor, it was first logged onto a control form so as to account for its receipt, location and general characteristics (Figure 3). The master file as received was duplicated and sample records were reviewed to determine if the contents of the records matched the information on the record layouts provided by the contractor. All discrepancies were reviewed with the contractor's personnel and changes to the master files were made as necessary. An information file was established to allow research personnel to acquire information about the subsystem master files to aid in their research activities.

FIGURE 2

'S SYSTEM COMPUTER PROCESSING
MARY INFORMATION FORM

SYSTEM _____ PROCESS
LEVEL _____ MONTH OF

2	3	4	5	6	7
FILE NAME AND/OR DESCRIPTOR	FILE ACCESS	REQUIREMENTS		CONFIGURATION	
		CORE	DEVICE	CODE	TIME

PROCESS _____ PA

MONTH OF APPLICATION _____ REFERENCE

5	6	7	8	9	10	11	1
EMENTS	CONFIGURATION		I/O	RECORD INFORMATION		BLOCK	
DEVICE	CODE	TIME	MEDIA	NUMBER	SIZE	SIZE	

All program documentation that was received from the contractor was studied prior to conversion to obtain information about the content and purpose of each program. Questions concerning information about the contents of the documentation were reviewed with the contractor. A thorough understanding of the existing programs was the object of reviewing the documentation.

Documentation standards were never a part of the vendor contract and as a result, the program and systems documentation had to be negotiated with the vendor on an informal basis.

Procedures for transmitting master files and programs were formalized so that the guesswork, with respect to structure and content of tapes received from ESRI, was removed from the transmittal process.

Next we received the program as tape records which had to be separated by specific program. The computer system was a Univac Series 70/3 and operated with a virtual memory operating system. With this system, jobs can be entered in batch form but we found that since the computer system has an online terminal input capability for code changing, creating files, and execution of job control language, our job turnaround time was more effective if we used a terminal mode. Since the language used by the contractor is ANSI COBOL, we used our ANSI COBOL compiler as the conversion language. The programs were placed "online" and changes were made using the project's terminal to review the coding and make the necessary changes for conversion. Appropriate job control language was written to allow the operating system to compile and test the programs during the conversion process. A program was written to keep an account of the computer time used for the conversion of all programs. The accounting program allowed the project staff to determine the number of compiles and tests needed before conversion was completed. After compilation was completed for each program, a test of program was made using the master file sent to us.

Figure 3

Tape Files

VEMIS Year and Subsystem: 1973 Follow-Up Survey
File: 1973 Graduate (Follow-Up) Survey Master

1. Secondary Public

Canister Label: STSC73
Reel Number: 2593 and 5996
Location: HEMIC
File Label:
Folder Number:

Date Received: 8/14/74
Record Count: 38000
Record Size: 180
Block Size: 3600
Beginning Tape Mark: No
Back-Up File Location: ESRI

2. Adult/Postsecondary Public

Canister Label:
Reel Number:
Location:
File Label:
Folder Number:

Date Received:
Record Count:
Record Size:
Block Size:
Beginning Tape Mark:
Back-Up File Location:

3. Postsecondary Public

Canister Label:
Reel Number:
Location:
File Label:
Folder Number:

Date Received:
Record Count:
Record Size:
Block Size:
Beginning Tape Mark:
Back-Up File Location:

4. Postsecondary, Private/Proprietary

Canister Label:
Reel Number:
Location:
File Label:
Folder Number:

Date Received:
Record Count:
Record Size:
Block Size:
Beginning Tape Mark:
Back-Up File Location:

Before the criteria for a test was established, a review of the published report format and organization was completed. The review allowed us to determine the type and quantity of records that would be used as test data for execution of the programs. The reports produced as a result of the conversion effort were compared with published reports. If the results were not satisfactory in trying to establish whether all the criteria in the program were tested, additional records based on report format were selected for subsequent testing.

Additional documentation was prepared to clarify parts of the contractor's documentation as well as documentation used as computer operator or users instructions. With the use of appropriate user documentation, selected reports can be produced for publication.

Results

Due to late funding approval and fiscal ramifications, we encountered difficulty in hiring staff. This resulted in a late start for the project and most of the planned schedule for conversion was not accomplished. For those programs that were converted, the I.U. now has the capability as a backup to the contractor to produce VEMIS "Follow-Up" Subsystem Reports for producing publications.

The following programs were converted, but no documentation was completed by the end of this phase of the project:

- USOE 3139 Report
- Annual Terminator Follow-Up Report
- Job Title Analysis Report
- Report by School for Unemployed Graduates

These programs were tested with data from the secondary level because master files were not available for postsecondary and adult/postsecondary levels of the system.

Plans for the Next Phase of the Project Starting July 1975

To continue with this project, certain major operational objectives have to be defined and implemented. In conjunction with continuing to convert, prepare user documentation, test and familiarize the staff with the operational details of the subsystems and products, the following are pertinent objectives:

- Assign contractor (ESRI) resources to preparing quality documentation prior to the turnover of programs.
- Develop detailed plans for operating those system functions that we show competence in.
- Develop an organized working relationship with contractor personnel.
- Refine the structure of documentation that is received from the contractor.
- Provide for an organization growth to operate the system.
- Work with a consultant to define and prepare detailed plans for operating the system and comparing the effectiveness of the system and determine the benefits of operating the system in the Department of Education.
- Prepare procedures that will facilitate transfer of system information.

The major thrust of the next phase of this project will be to acquire from the contractor all programs that are used to produce reports for the following subsystems:

- Approved/Legal Curriculum System
- Institution Data
- Student
- Personnel

- Curriculum
- Follow-Up (incorporation of 1975 changes to converted programs)
- Annual Forecast
- Expenditure
- Federal Projects
- Administrative Services

Each subsystem, depending on its stage of development, produces reports for different segments of education. These segments include secondary, post-secondary, adult/postsecondary and private.